Revised Wool module

BUREAU TECHNICAL NOTE

Relates to:	Revised wool and wool quality modules
Date:	October 2020

Summary of key features

1. Replaces the three modules, Wool, Fine Wool and Wool Quality, with two modules, Wool and Wool Quality.
2. Some rationalization of trait recording, using FW6 or FW12, dropping FW6N, FW12S and FW12N.
3. Fibre diameter and wool colour can either be objectively measured (FDIAM, COLYZ) through a wool testing laboratory or subjectively assessed (FFINE, COLSC).
4. Some traits (FDIACV, FCURV, STAPLN, SSTR) have been removed from the wool quality index as there were no discernible premiums or discounts for those traits. They can be recorded and reported but no BVs are produced.
5. The genetic parameters, heritabilities and genetic correlations, have been recalculated and differ from the current modules reflecting the greater diversity of breeds in current New Zealand sheep flocks. ***This means wool BVs and indexes will change for all animals, but they will be better predictions of genetic merit for wool production.***
6. The revised Wool module produces fleece weight breeding values and the Dual Purpose Wool index (DPW). The Dual Purpose Wool index (DPW) is in the New Zealand Standard Maternal Worth index (NZMW).
7. The revised Wool Quality module produces fibre diameter and wool colour breeding values and the Dual Purpose Wool Quality Fineness index (DPWQF) and the Dual Purpose Wool Quality Colour index (DPWQC). The DPWQF and DPWQC indexes are not in NZMW but are additive with DPW and NZMW.
8. Wool quality fineness and colour are restricted traits, so only flocks recording these traits will be able to report the relevant indexes and breeding values.
9. The relative economic values for wool quality traits have changed. Previously there was no reward for finer micron in dual purpose wool and a linear reward for micron across the fine wool micron range. This has been replaced with a non-linear approach that has a small incremental reward at the coarser end and an increasing reward at the finer end of the micron range, more accurately reflecting market prices.
10. Non-linear DPWQF is only available from NZGE evaluation.

Introduction

The value of wool has been variable in recent years, so a number of dual purpose breeders are breeding for finer wool to improve wool returns, while others are moving to woolless or shedding sheep. The current wool module does not cater for dual purpose flocks breeding for finer wool as there is no reward for finer fibre diameter.

A review of the wool modules, including re-estimating the genetic parameters used to produce the breeding values and a review of the key traits affecting wool price, has been undertaken. This has resulted in a number of changes and rationalization of the current three into two wool modules that will produce fleece weight and key wool quality breeding values (fibre diameter and wool colour).

Revised Genetic Parameters

All wool data in SIL was used to recalculate the genetic parameters for wool.

- Heritability of FW12 stays the same at 0.35
- Heritability of fibre diameter is slightly higher than previously (0.5 versus 0.4)
- Heritability of wool colour is 0.15
- Correlation between liveweights and FW12 is lower than previously

These changes probably reflect the greater diversity in breeds and breed composition since the genetic parameters were initially calculated.

All BVs and indexes will change due to the changes in the genetic parameters, but they will be better predictions of an animal's genetic merit for wool production.

Rationalisation of recording fleece weights

As part of the review, there is rationalisation of the wool traits, some of which had little or no data.

The changes that may affect you when loading data are

1. FW6 and FW6N (not shorn as lambs) are now loaded as one trait - FW6.
2. FW12, FW12S (shorn as lambs) and FW12N (not shorn as lambs) are now loaded as one trait - FW12.

The analysis still uses all data, so there will be no change to fleece weight data used in the evaluation. The between flock corrections account for differences in the traits.

Recording wool colour measurements

Wool colour can either be objectively measured by a wool testing laboratory (COLYZ) or a colour score subjectively assessed at shearing (COLSC).

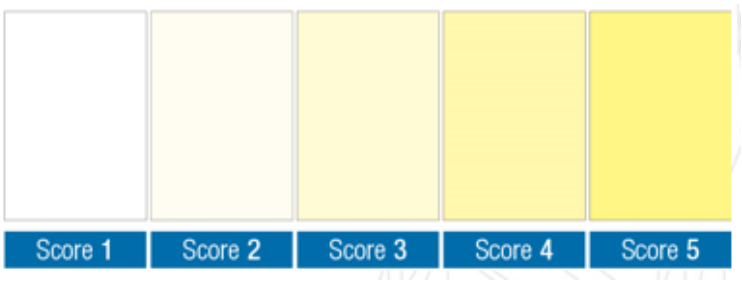

Figure 1. Wool colour scores. (These are based on the Sheep Genetics Australia system for consistency.)

Recording fibre diameter

The most accurate measurement of fibre diameter is a wool laboratory measurement on a mid-side sample taken at shearing (FDIAM). Subjective assessment of fibre fineness (FFINE) is also accepted but should be done by a registered wool classer.

Recording and reporting of other wool quality traits

Wool testing labs report a range of wool characteristics, as well as fibre diameter and colour, which can be recorded and reported in SIL, but breeding values will only be produced for fibre diameter and wool colour.

Wool modules in SIL

The three current wool modules (Wool, Fine Wool and Fine Wool Quality) are replaced with two wool modules, Wool and Wool Quality.

Table 1. Predictor traits, breeding values and traits used for connectedness in Wool goal trait groups.

Old Wool	Old Fine Wool	Old Fine Wool Quality	Revised Wool	Revised Wool Quality	
				Fineness	Colour
Predictor Traits					
FW12>FW12S> FW12N>FW6 CFW12 as above FDIAM FFINE WWT LW6/8/10 LW12	FW12>FW12S> FW12N>FW6 CFW12 as above FDIAM FFINE WWT	FW12>FW12S> FW12N>FW6>FW6N CFW12 as above CWY12 FDIACV FCURV STAPLN SSTR COLY COLYZ WWT	CFW12>FW12 FW6 plus historic data: CFW12S FW12N WWT LW6/8/10 LW12	FDIAM FFINE	COLYZ COLSC
Breeding values				**Restricted to flocks recording the traits**	
LFW FW12 EFW FDIAM	CFW12 FDIAM ECFW AFDIAM	FDIACV FCURV STAPLN SSTR COLY COLYZ	LFW FW12 EFW	FDIAM AFDIAM	COLSC
Connectedness traits					
FW12	FW12, CFW12, FDIAM	FW12, CFW12, FDIAM	FW6, FW12	FDIAM, FFINE	COLYZ, COLSC

Relative economic values (REVs)

An analysis of wool prices by AbacusBio showed wool price was quite variable across years at all micron points (Figure 2 - vertical black circles). The reward for finer fibre diameter was greatest at 24 to 29 microns, reducing through 30-35 microns, with no change in the 37-40 micron range (Figure 2 - curved blue line).

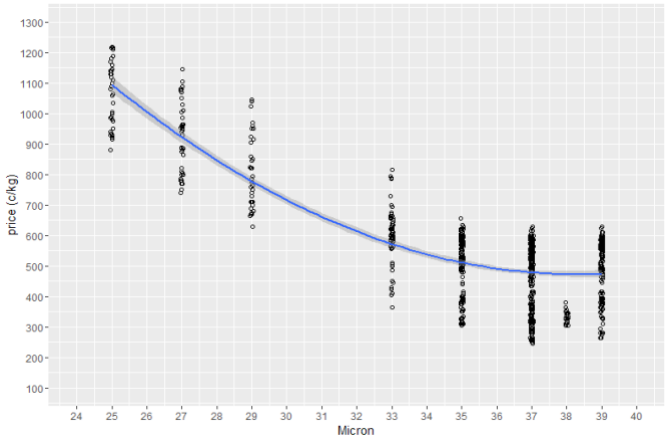

Figure 2. Average price (cents/kg) at a range of fibre diameters. The black circles represent wool price for the indicator fibre diameters at different time points. The blue line represents the average relationship between price and fibre diameter.

This price information, combined with costs and the number of times a trait is expressed over an animal's lifetime, form the basis of the economic values (REV) used to calculate the indexes.

Indexes

The Dual Purpose Wool index (DPW) formula remains unchanged. However, there will be changes in index values due to changes in the fleece weight breeding values.

DPW = LFWrev x LFWBV + FW12rev x FW12BV + EFWrev x EFWBV

DPW (cents) = 341 x LFWBV + 153 x FW12BV + 443 x EFWBV

Wool Quality has 2 sub-indexes, Dual Purpose Wool Quality Fineness (DPWQF) and Dual Purpose Wool Quality Colour (DPWQC), the two traits for which there was a consistent price signal. To better reflect market conditions for all flocks across the micron range, a non- linear approach, similar to that used for capped reproduction, is used in the Dual Purpose Wool Quality Fineness index. This has a higher reward at finer fibre diameters, reducing to no change for diameters over 37 microns.

DPWQF (cents) = non-linear FDIAMrev x FDIAMBV + non-linear AFDIAMrev x AFDIAMBV

DPWQC (cents) = -112 x COLSCBV

Flocks recording and selecting for wool fineness or colour, should report both DPW and DPWQF if recording fineness and/or DPWQC if recording wool colour to fully characterise wool merit.

DPWQF and DPWQC are restricted goal trait groups. Only flocks recording the relevant traits will be able to report the breeding values and indexes.